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East Europe Report

SCIENCE AND TECHNOLOGY

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EAST EUROPE REPORT

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CONTENTS

SLOVAK ACADEMY REVIEWS, PLANS

Prague RUDE PRAVO in Czech 13 Jun 85 p 1

[Text] The aim of the 49th plenary session of the Slovak Academy of Sciences, which took place on Wednesday in Bratislava, was to discuss the report of 1984 activities and the program for development of the Slovak Academy of Sciences for 1986 through 1995. Participants were: Department Head of the Central Committee of the Czechoslovak Communist Party of Slovakia Ivan Litvaj, Deputy Chairman of the Czechoslovak Academy of Sciences academician Premysl Rys, and other guests.

In assessing last year's activities of the Slovak Academy of Sciences, the Secretary for Sciences of the Slovak Academy of Sciences, academician Vladimir Mikulas emphasized that the vocal point of research were the tasks of the basic research for the state plan, directed in a more goal-oriented way toward gaining results that could be used in practice by the society. Of the many projects which became of significant application in profitable ways to the scientific and technological development of the Czechoslovak economy, foremost were the results achieved by the Institute for Experimental Metallurgy of the Slovak Academy of Sciences, on the basis of which 2,850 tons of sheet metal of quality E 490 were produced in VSZ Kosice. The enterprise Bukoza Vranov tested manufacture of cellulose ionomers based on mesh microcrystal cellulose which was developed by the Chemical Institute for Chemical Research of the Slovak Academy of Sciences. The Metrology and Metrology Technology Institute of the Center for Electro-physics Research of the Slovak Academy of Sciences developed a supraconductor magnetometer. It is being produced by Tesla Vrable, GR OGAKO Partizan uses the videographic system SM 54-34 of the Institute of Technical Cybernetics of the Slovak Academy of Sciences for the automatization of the footwear industry, etc.

Significant results were achieved by workers of the Slovak Academy of Sciences in international scientific cooperation with academies of sciences of socialist countries, in the framework of CEMA comprehensive plan and the Intercosmos program. They collaborated on, among other things, testing new technological procedures on semiconductors of precious elements, establishing norms for protecting reinforced concrete constructions from corrosion, and designing the devise MONITOR for measuring the parameters of plasma in sun wind, etc.

The program for the development of the Slovak Academy of Sciences in the 1990's was discussed by the chairman of the Slovak Academy of Sciences, academician Vladimir Hajko. He stated that this concerns a basic document which will be gradually amplified and redefined according to the needs of society. The program defines the participation of the Slovak Academy of Sciences workplaces in creating conditions for the development of science as a production force and in developing other social functions of science.

In their discussions the members of the Slovak Academy of Science concentrated mainly on the ways of improving research work, and a faster utilization of scientific findings in society's economic practice. The department head of the Central Committee of the Czechoslovak Communist Party, Miloslav Dolezal, also made a presentation. He emphasized that in the future development of the national economy and the life of our society as a whole, the quality and effectiveness of scientific work is an extraordinarily important factor. It is expected of our scientists that when solving scientific problems in the future, they will keep a systematic, goal-oriented, and responsible attitude, which will bring socialism, peace, and benefits for all of our society. At the same time, while developing scientific and technological progress, they will make maximum use of the potential of international technological integration and cooperation with partner scientific establishments of other socialist countries, particularly the Soviet Union.

12605
CSO: 2400/474

R & D SOCIETY PUBLISHES MANIFESTO

Prague RUDE PRAVO in Czech 7 Jun 85 p 1

[Text] Participants of the allstate aktiv of the Czechoslovak Scientific and Technological Society [CSVTS], held in Prague on 6 June 1985 in the year of the 40th anniversary of Czechoslovakia's liberation by the Soviet Army--and the 30th anniversary of the founding of this social organization, support the efforts of the CPCZ to effect and promote a turn in the thoughts and deeds of people in the spirit of intensive development in our economy, higher evaluation of resources, and more rapid introduction of scientific and technological achievements into practical use. We appeal to all members and branches of our social organization to adopt concrete pledges in honor of the 17th CPCZ Congress, commitments leading to the development of creative approaches in labor collectives, specifically focused on the following:

--the most urgent product and technological innovation, shortening of the modernization cycles;

- better working conditions at worksites, shops and plants, with the aim of gaining new information for further rationalization, higher productivity and an overall rise in the quality of work;
- mobilization of raw and other material reserves, reduction of idle supplies by putting them to use promptly;
- elimination of administrative bottlenecks by simplifying regulations and scrapping unneeded ones;

We join in the initiative of the Prague CPCZ Committee in the preparations of the 17th CPCZ Congress, aimed at the advancement of worker initiative, under the slogan:

Combining science with production, modernization, and a creative effort in collectives toward the fulfillment of the 5-year plan!

We appeal to all CSVTS members, organs, organizations and the entire management aktiv to adopt this slogan as their own, to support efforts to fulfill the last year of the Seventh 5-Year Plan and help create good prerequisites for the Eighth 5-Year Plan.

9496
CSO: 2400/456

CZECHOSLOVAKIA

BRIEFS

SOVIET COOPERATION IN R&D--MOSCOW (From our CTK correspondent). CSSR Deputy Premier and Chairman of the State Commission for Scientific, Technological and Investment Development, Jaromir Obzina, met on Wednesday in Moscow with the Deputy Chairman of the USSR Council of Ministers and Chairman of the USSR State Committee for Science and Technology, Guriy Marchuk. The two officials discussed certain concrete tasks of further intensification and strengthening of CSSR - USSR cooperation in science and technology. The CSSR Ambassador to the Soviet Union, Miroslav Zavadil, was present at the meeting. [Text] [Prague Rude Pravo in Czech 7 Jun 85 p 1] 9496

CSO: 2400/456

PLANS FOR LONG-TERM INTRODUCTION OF FLEXIBLE AUTOMATION DISCUSSED

East Berlin WIRTSCHAFTFSWISSENENSCHAFT in German Vol 33 No 4, 1985
pp 481-497

[Article by Peter Krejcik, Franz Pleschak and Frank Wiede: "Experiences and Tasks in Increasing the Efficiency of Flexible Automation"]

[Text] The high renewal rates for products which are necessary for increasing efficiency lead to frequent change-overs in the reproduction process of the combines and factories. As the international market and the national economy place increasingly higher demands on products the product lines of the combines and companies expand, the percentage of production geared to customer wishes increases and the production runs become shorter. At the same time requirements as to lower cost, high quality and shorter delivery times become more stringent. All these factors make it necessary to meet the rapidly changing development and production tasks by improving the ability of the combines and factories to respond. The more stringent conditions on the world market make it necessary "to quickly react to new demands, to make the production structure correspondingly flexible, to quickly translate into production the results of the scientific/technical progress and thus to ensure large exports".(1)

The response times of the combines and factories must be shortened in order to be able to meet more effectively the newly arising and changing demand, special customer wishes and changing conditions on the international market. This can be achieved either by shortening or eliminating individual time elements in the response time or by executing an increasing number of process components within a cycle in parallel. Measures that can contribute to a better response time are the implementation of the subassembly principle and work based on projections, design and technical standardization, improving the information flow with regard to orders and creating corresponding organizational solutions oriented towards orders received, increasing the professional qualifications of the workers, making workers more available and mobile and improving the availability of material/technical resources. Among the measures to increase the ability to respond, flexible automation is gaining more and more economic importance.

Features of Flexible Automation

Flexible automation which is based on the possibilities offered by microelectronics represents a new developmental stage in automation. It leads to considerably expanded applications of automation and makes possible effective solutions, particularly when developmental and production tasks change frequently. The new quality of flexible automation is illustrated by the following features:

--Complexity (processes to prepare, implement and carry out production as well as management and planning processes are automated cohesively based on complex economic and social objectives);
--Flexibility (different tasks can be performed with little retooling, short response times, high degree of responsiveness and high productivity);
--Integration (process components are integrated and combined in comprehensive solutions based on process and systems analyses and the scientific analysis of the processes);
--Optimization (the scientifically based design of the information and material processes leads to a higher process level and thus to optimized results which are oriented towards efficiency).

Automation solutions with these features have a high potential for efficiency. Benefits are, for instance, larger dimensions and higher development rates, and the individual positive elements result in overall benefits. Reduced expenses, time savings, quality improvements, production expansions as well as better working and living conditions for the workers usually go together, and their combination leads to cost reduction and increased profit and promotes creativity and an increased sense of responsibility. Flexible automation meets the standards for comprehensive intensification. It includes all areas and phases of the reproduction process, opens up all intensification factors and--most of all--it contributes substantially to achieving an increased efficiency with new products and new technologies. The new stage in the implementation of the economic strategy is characterized by this comprehensive intensification.(2)

Flexible automation not only makes possible increased and new application features of the products and leads to new product structures for the national economy, but it increases at the same time the technological level of the material and information processes in the combines and companies. The efficient cooperation between man and the means of work and work objects reaches a higher level based on a change in the distribution of functions. Flexible automation influences the innovation of products and technologies and thus represents an important factor for quantitative growth and the improvement of the qualitative structure of production.(3)

It goes without saying that single-purpose automation with its typical effects continues to be economically viable where production runs are large, production periods for the products are long and consequently production is changed infrequently.

The preparation, organization, introduction and application of flexible, complex automation solutions is based on the social requirement of obtaining a high benefit with the lowest possible one-time expense. In line with

comprehensive intensification it is necessary to develop automation solutions primarily on the basis of modernizing the existing basic means. Therefore, the producers of machinery and equipment who make available modernization modules and services carry a particularly high responsibility for increasing the level of automation. By streamlining the means of the combines and factories preconditions have to be created so that the modernized basic means can be combined into comprehensive automated solutions using transport and storage technology, handling technology and measuring and control technology. In this context, the possibilities resulting from the development of microelectronics, robotics, information processing and communications technology must be put to practical use more quickly.(4)

The potential of automation for increasing efficiency can be fully realized only if all means leading to complex automation solutions work together and if the individual measures remain within a cohesive context. This requirement must already be taken into account in the efficiency-oriented conception and design of automation solutions.

Factors Deterimining the Efficiency of Flexible Automation

The Economic Conference of the GDR in 1983 emphasized: "Based on automation a number of basically new possibilities for increasing work productivity in the combines are becoming evident, and it must be our goal to put them to practice with greater determination."(5)

Based on the task to be solved and the work object the features of the automation solutions and the application conditions must be determined in such a way that the total potential for efficiency will be exhausted. Proceeding from the automation solutions realized so far, for instance in connection with the use of industrial robotics technology, of NC, CNC machines and flexible manufacturing systems as well as the use of computer technology in the areas of production preparation, the following general conclusions can be drawn from the experience gained:

1. Since the means of work take over more high-quality functions from man, (6) workers become directly available for tasks in other areas of the combines and factories, such as the development of means for increasing efficiency and the production of consumer goods. The more functions are being automated, the better are the conditions for freeing up workers and for achieving an increase in production and profit by using them elsewhere. However, it should be noted that the increase in the functions performed by automation frequently is connected with a progressive increase in the one-time expense. Therefore, optimizing calculations are essential. However, at present the assumption can be made that more functions should be taken over by automation. If too many non-automated functions remain and if there is a constant change between automated and non-automated functions, there will be no extended periods which do not require manual work, which are required for changing over to the operation of several machines, for task expansion and a change in the workplace and primarily for increasing the shift factor. For recognizing the most favorable starting points for direct labor savings it is important to know the structure of functions and the frequency of activities requiring human intervention. In this context, new

human activities and functions resulting from automation must be taken into account. The planned process towards freeing up workers must be carried out politically and ideologically, i.e. all changes must be discussed and solved jointly with the workers affected. The level of qualifications must be raised in line with the new tasks, and conclusions with regard to economic territory must be drawn.

2. The introduction of new and the perfection of existing technological processes and the modernization of the basic means related to automation result in an increase in productivity (efficiency) of the machinery and equipment. By using the theoretically and technologically possible productivity to the fullest extent, reducing the downtimes of machines and workforce, automation can result in a substantial increase in production and profit. If the machine time saved or if the increased time reserves of the machine which can be used productively is not utilized for expanding production, the desired cost degression will not come about and the production efficiency is reduced. This aspect was also pointed out by Gunter Mittag in his presentation during the consultation meeting of the central committee of the SED with the director generals of the combines and the party organizers of the central committee of the SED [Socialist Unity Party of East Germany] in Leipzig.(7) Utilization of the potential productivity of machines and equipment deteriorates if the organizational level does not keep pace with the development of the technological level or if the productivity of individual elements of technological processes is developing disproportionately. Automation solutions must be designed and organized in such a way that their parameters correspond to the worktime and machine time structure which results from the development of the production structure and that the general integration of technologies based on process and systems analyses remains intact. In addition, management must constantly analyze the productivity of technological processes in order to find efficiency reserves.

3. Automation makes possible considerable time savings in the reproduction process if the reduction in time required is based on a determination of the time periods required, if corresponding measures are taken to adapt the process organization to the new time structures and if automation results in an integration of process components. The economic benefit of a reduction in the process time required becomes evident when fewer operating means are tied up and profits increase because products get to the market sooner. As long as automation is limited to a single workplace, these effects are hardly noticeable. With the increasing complexity of automation the benefits of reducing the time required become more important. This leads to the conclusion that the individual automation measures must be designed in such a way that they can be combined step by step into comprehensive solutions.

4. Due to their technical and organizational features such as free programmability, high-level controls, variable tool and workpiece storage, modular design, variable chaining and continuous flow of information, flexible automation solutions permit a fast and low-cost response to demands for product changes, renewal rates and short delivery times which are made on the international market and in the national economy. There are technical and economic limits to the increase in the potential flexibility of an automation solution. A flexible solution serving only one single work task is

technically overdimensioned, which also explains the higher one-time expense for specific solutions. The broad utilization of flexible solutions for different tasks which can be used over a longer period and have a longer useful life justifies the higher one-time expense in economic terms. If, however, actual and potential flexibility do not correspond to what is required, the one-time expense is judged to be not economical. The use of a higher degree of flexibility becomes apparent in lower retooling expenses. Frequent retooling still causes downtimes which lower actual productivity. Therefore, limiting the frequency of retooling and the time it takes for each retooling are among the requirements of flexible automation. This results in certain requirements as to the structure of subassemblies and individual components. On the other hand, the benefits of increased flexibility can be seen in short response times. To what extent these benefits materialize depends on the correct integration of an individual flexible solution into the overall technological process and further into the reproduction process of the combines and factories. In order to achieve short response times it is not sufficient to have basic means of production which can be used in a flexible manner, all company areas must be raised to the necessary level of flexible work. This includes the proportionate development of flexible production preparation and implementation, designing a management structure and organization in line with this level, ensuring the necessary interaction among the collectives with regard to orders and the development of socialist competition and stimulation which meet the requirements of flexible work.

Automation increases the reliability of technological processes and the quality of the respective work results. Automation will result in higher quality in particular when the development and safeguarding of product quality and the possible impact of automation are seen as an integral process. Economic benefits in the form of cost reductions and profit increases will come about only if there are determined efforts to integrate measures for quality improvements. The individual measures must be derived from the objectives to increase the efficiency and quality of products and their contents must be related to each other. Chains of effects in quality improvement in the reproduction process continue in particular when complex automation is used.

Automation is an economic and social requirement. On the one hand, economic and social objectives are the basis for designing and evaluating technical solutions, on the other hand, the subjective performance prerequisites must be created in time for the planned increase in efficiency to take effect. These prerequisites depend on the specific automation object and the selected principles and means of automation. Automation changes the position and function of man in the work process. Manual labor and mental activities which can be formalized are performed increasingly by machines, stressful exposure is reduced step by step, qualifications increase and are better utilized and work safety increases. Mental and creative activities become more and more important. Thus, man's social activities in general become more varied.

Automation is related to processes which make increasing and partially new demands on man to which he must adjust. Meeting these demands is an essential part of the preparation for automation. The social effects do not occur by themselves but must be designed, projected and put into practice

just like economic effects by correctly designing the work task and the means of automation used and by long-term technical and political-ideological preparation of the workers.

When preparing automation solutions great care must be taken not to demean work by leaving only monotonous activities for man which require no qualifications (placing workpieces in storage, disposing of chips, etc.). When automating one must not stop half-way. On the contrary, it is necessary to expand and enrich the content of work. This is done by assigning additional functions to man or by expanding his area of responsibility. The design of complex solutions on the basis of automation is becoming more and more an essential precondition for a rapid and comprehensive increase in performance and efficiency.

Relationship between Complex and Flexible Automation

The complexity and flexibility of automation are closely related. Flexible automation produces the scientific-technical bases and elements of solutions, on which complex automation is built (Fig. 1). First, there is automated manufacturing technology, which is being used increasingly in the form of computer-controlled machine tools and machining centers, technological units and manufacturing cells. It also includes the broad spectrum of process-flexible industrial robotics technology, whose range of applications is expanding constantly by using sensors and controls which become increasingly more powerful. Process-specific robots also contribute to complex solutions if they streamline specific technological operations in the overall process or increase the degree of automation of existing equipment through machine integration. The basic elements of flexible automation further include those solutions related to auxiliary processes. These include transport technology with freely programmable floor transport vehicles and transfer stations at the work places, automated storage technology based on high shelving storage with computer control and automated shelf accessing devices, automated measuring and testing technology as well as supply and waste disposal technology. The electronic computer technology and the related system support and data bases have a key role within the elements for solving flexible automation. Mainframe computers, small commercial computers, office computers, microelectronic controls and a constantly increasing range of powerful peripheral devices make it possible to automate processes for preparing and implementing production with an increasing degree of integration. Flexible automation is continuously entering all phases of the factory reproduction process. The technical and economic limits are shifted and expand the possibilities for automation.

Complex automation solutions depend on how the individual elements of flexible automation are combined and where they are concentrated. In this context, flexible automation itself requires flexibility. The high renewal rates of products as well as the increasingly customer-oriented production require a high adaptability of the automated production equipment. Product changes and fixed capital reproduction, in particular modernization, are closely related

depending on the specific technological processes. Using the basic means over several product generations has economic benefits and saves on capital investments. This requires a certain degree of flexibility. If it is not obtained, economic losses result due to non-utilization and products which are discontinued prematurely. Within the framework of complex automation solutions, production preparation, management and planning have to be designed in such a way that quick response to changed demands becomes possible and production can be directed with few interruptions.

Partial or spot solutions are a starting point for complex automation. These are used in production as work places requiring few operators and little monitoring and in the production preparation as computer-aided activity-oriented workplaces. These solutions must be prepared as modules which become effective independently with defined interfaces so that they represent compatible building stones for the subsequent complex automation. Based on these modules, complex automation is implemented in two levels.

Complex automation, level I covers the tasks of departments and sections in the factory. These include the design of production units requiring few operators and little monitoring and the automation of selected information processing processes for production. At the same time, computer-aided, interrelated workplaces with program systems for the design and technological preparation must be created gradually for selected partial areas. Computer-aided solutions for production planning, for supervision and control of manufacturing, material handling, cost accounting and the management of factories and combines must be established. Solutions at level 1 are primarily characterized by the automation of relatively closed information processes within one task area.

Level 2 of complex automation is characterized by the integration of process-related solutions. Automation is highly integrated, which is evidenced by the uniform and compatible level of automation of the factory areas and the informational interconnection of processes from design to technology, planning, manufacturing control and production to the sale of products. Integrated systems for design and technological preparation and manufacturing (CAD/CAM systems) indicate even today the type of automation solutions at this higher level which will be prevalent in the nineties. The conditions and prerequisities for the factory with complex automation requiring few operators and little monitoring are being created step by step.

Complex and flexible automation includes the following main trends:

--Development of products and product systems with high-quality application properties corresponding to the demands for largely automated manufacturing technologies;
--Design of integrated data processing systems for automating processes for technical preparation and the management, planning, organization and control of production;
--Design of automated manufacturing systems based on the integration of main, auxiliary and control processes.

These main trends are reflected clearly in the automation solutions of

leading combines in the construction of machinery and plants which are either in the design stage or have already been implemented. At present, the material and technical basis in these industries is being modernized extensively. Automated manufacturing sections must be created which will increasingly influence the technological progress in the future.(8) Examples are the solutions in the main plants of the combines VEB [Nationally Owned Concern] Forming Technology "Herbert Warnke", Erfurt, VEB Machine Tool Combine "Fritz Eckert", Karl-Marx-Stadt and VEB Machine Tool Combine "7. Oktober", Berlin. In these factories, numerous solutions can already be clssified as level 1 of complex automation, such as the machine systems PC-3 (Erfurt) and PRISMA-2 (Karl-Marx-Stadt), the largely automated and integrated product-specific manufacturing sections for axially symmetrical parts (Berlin, Erfurt) or prismatic parts (Karl-Marx-Stadt, Berlin) as well as the program systems for medium-range and short term production planning which are being processed in all three combines to a large extent at computer-aided and video terminal supported workplaces. The tendencies towards integrated automation are quite obvious. The CAD/CAM solution for welding modules in the combine Forming Technology in Erfurt is an excellent example.

Complex automation solutions lead to a great increase in efficiency. In this context, the width and depth of the economic and social effects are determined by the extent of the process changes caused by automation. Typical process changes caused by complex automation are illustrated in Fig. 2. The analysis of process changes and its interrelations as well as the determination and quantification of the resulting benefits are a prerequisite for determining and proving the effectiveness of complex automation solutions in a comprehensive manner.

Automation of Processes for Production Preparation - Part of Complex Automation

Within the framework of complex, flexible automation the more efficient design of information processing processes in the preparation of production is of particular importance.(9) The quality and efficiency of products and technological processes is determined more and more by the work of designers, technologists and planners. Implementing upgrading concepts, actively influencing the market, reaction to customer demands, mastering the complex innovation processes require a corresponding performance in the production preparation. The automation of production preparation makes noticeable contributions towards increasing the technical, economic and work-scientific level of the products and their design, manufacture and implementation processes as well as adjusting the capabilities of the areas involved in production preparation to the increased demands. Short development times, low development and manufacturing costs, high product quality and market effectiveness are results of automation.

Preparing and supplying the technical documentation to meet these demands requires utilization of the information processing technology in production preparation to a greater extent and in new structures. Here, the key element must be an integrated, computer-internal further processing of

information that has been obtained once in such a way that there are no losses in time and information for the following processes. This creates the essential starting points for complex, flexible, computer-aided solutions for all informational work processes in the combine and the factory. On the one hand, integration leads to an increased number of parallel processes within a cycle, reduction in time and combination of design and technology; in addition, information processing is integrated with the subsequent processes of production implementation and the management and planning processes.

Processes for the preparation of production are characterized by the change from routine activities to creative work, by a high degree of complexity of the problems and tasks to be solved and by numerous variation possibilities when finding solutions. This means that the use of computers is related to comprehensive preparatory work for the scientific penetration as well as for classification and systematization of the objects and processes and for introducing the corresponding methodological-organizational changes. Computer technology, program and data bases must be structured and dimensioned optimally in line with the specific conditions required for solving the tasks. The information provided must serve the development of a creative work style.

Automation in production preparation is accomplished by using computer and video terminal technology at the workplace or by direct access to mainframe computers. In doing so, the creative aspects of work are emphasized more strongly. Man is using modern technology primarily in an interactive mode. In those cases, where activities must be performed for which formulas and algorithms can be used, the advantages of technology such as processing of large amounts of data at high operational speeds are utilized. In the future, engineering tasks will typically be aided by computers and video terminals. Automation in production preparation is represented by the computer and terminal-assisted work mode.

Video terminals (intelligent terminals) or computers at the workplace with different capacities are an integral part of computer and terminal-assisted work places. At a more advanced level, these computers are connected to a host computer and supplemented by further necessary peripheral technology in the form of data input and output devices as well as devices for storing information. Typical features are the access to information stored in decentralized or centralized data bases and the interactive mode. The dialog between man and machine combines the advantages of high operational speed and the manipulation of large amounts of data by the computer with man's ability to make decisions. The product program for decentralized data technology developed by the VEB combine ROBOTRON makes it possible to design the workplaces in response to the specific conditions. Implemented solutions or solutions which are in preparation, such as the CAD/CAM solution AUTEVO-ROTA 1 on the basis of AKT A6454(10) are convincing evidence of the capability of intensification. The complete process from design via technology to the production of axially symmetrical parts is streamlined. The production drawings for individual parts are assisted by computers and video terminals; the same applies to all technological production facilities, such as workplace master cards, work instructions, material use standards as well as NC

controlled punched tape.

Integrated automation of processes for the preparation of production has significant economic effects. In the design stage, the design risk is reduced. With video terminal-assisted interactive work time savings and quality improvements are possible. Assigning tests and model studies to the computer results in the early detection of errors. Making the parts list data more current and complete has positive effects on the technological and economic-organizational preparation and implementation of production. A high level of production organization, the reduction of downtimes and finally an increased continuity of production require high-quality primary documents. More precise calculation methods, optimizations and simulations result in material-economic effects, increased reliability and life, reduced reject, rework and warranty costs, reduced maintenance costs and thus in increased product efficiency for the user.

In technological preparation and its subsequent processes, the computer and terminal assisted work mode results in considerable time and cost savings when capturing data and updating workplan master data as well as in time savings when preparing workplan master cards and programming NC machines. Data capture and processing becomes safer with positive results on the continuity and stability of the production process, the reduction of non-productive time and improved basic funds savings.

The extent and scope of these effects depends on the complexity of the computer and terminal-assisted work mode used. Currently, a transition is made from the partial use of information processing technology geared towards selected activities to a systems-oriented integrated use. In this context, the partial, acitvity-oriented solutions are essential for advancing to higher levels. However, the activity-oriented solutions can be expanded only if they consistently follow a modular design for device technology and program and data bases. Therefore, the long-term technical and organizational conception of automation must be based on a modular concept.

Thus, automation of production preparation is implemented in the following development stages: as a starting point there are partial solutions, characterized by activity-oriented use of computer technology, automation of individual, product-independent and highly repetitive individual operations or process steps, little information exchange between the individual tasks and little information flow maintenance on the part of man. Based on this stage, complex automation, level I follows with the process-oriented use of computer technology with the following characteristics:

--execution of product-dependent or object-related program chains for a selected product line;
--interrelation of information for the individual tasks for a selected product line;
--further computer-processing of the information generated (data bases) for a selected product line,
--autonomous use of program modules of the modular program chain for activity- oriented use.

Level 2 of complex automation increases integration by:

--system-oriented use of computer technology for all processes of the product program which prepare production,
--automated generation and administration of most data to develop and produce the products,
--making available the data of the data bases in a cohesive, interrelated information processing system.

The basic economic effects indicated for the computer and terminal-assisted work mode differ depending on the level reached, a fact which must be taken into account in the design and economic justification of solutions. For instance, even the implementation of partial solutions allows for great work time reductions, however, they show very little effect on time savings and increase in response time due to the insufficient overall changes and the lack of an automatic information flow. On level 1, shorter process times can be obtained by interconnecting programs and data bases. Level 2 is characterized by the fact that within a cycle all partial tasks are processed in parallel to a great extent, which results in considerable time savings and, as a consequence, in a high degree of responsiveness. However, in order for the high degree of responsiveness to become effective in the combine or factory as a whole, flexible solutions for all elements and phases of the reproduction process are required.

Tasks for the Further Implementation of Complex and Flexible Automation

To translate and guide the process of complex, flexible automation into performance the conceptual preparation is taking on increasingly greater significance. Process analyses, performance comparisons and the scientific penetration of the process make it possible to take into account the technical-technological, organizational, economic and social connections when developing and implementing complex automation solutions. In this context, the conceptual work always assumes the unity of product renewal, technological innovation and basic funds reproduction. Derived from this, the long-term development conceptions of the combines and factories, which currently must be worked out in the form of refinement conceptions, contain the essential performance objectives, projects and measures to implement the main features of complex, flexible automation. The performance and effectiveness increases resulting from the projects and measures must be weighed against the objectives set. This requires an exact determination of the economic and social effects resulting from automation and, based on that, a complex determination and substantiation of the economic benefits. Figure 3 shows the typical effects of complex and flexible automation and establishes the connection with the benefit elements, in particular cost reduction and profit increase and their determining factors.

The conceptual studies include preparing a concept of expansion stages. Expansion stages assure that the partial solutions are appropriate and that the partial benefit elements become effective sooner, before the comprehensive solution is introduced. This distributes the use of resources

over longer periods and makes it easier to provide the necessary material and financial means while giving priority to the implementation of solutions which save capital expenditures.

For instance, the introduction of computer and terminal-assisted workstations must be based on the principle that a noticeable performance increase in the production preparation must be obtained as early as in the first expansion stage and that this increase must continue without interruption with the increased level of automation, with the transition to higher-level development stages, always in accordance with the respective expansion stage. The sequence and structure of the expansion stages is determined to a large extent by the influence customer demands have on the tasks of production preparation and by the extent of the product line and the product turnover. If the customer wishes play an important part, there will be special requirements as to flexibility and process duration. They are best met by comprehensive solutions. If the technological preparation requires a large amount of changes and updating even computer and terminal-assisted workstations for the capture and update of master data can result in a considerable efficiency increase. A similar effect can be obtained if you have a large product line where technological preparation generally is the focal point.

Based on the primary data stored it is possible to include processes for planning, organization, control and cost accounting in the computer-assisted work and to use consistently the comprehensive data base for all program systems. This is based on the design of separate modules according to function with defined interfaces. This allows the use of a comprehensive computer when processing orders by extensively using decentralized computer technology and an interactive mode.

In order to expand the applications of CAD/CAM solutions, the preconditions for the development of system data must be created by studying the design, technology and economic specifications of the products to be developed and manufactured as well as the methodology and sequence of the scientific-technical work processes. Automation of production preparation will be accelerated by the more general availability of powerful, decentralized computer technology including graphic peripherals.

During production, the intensification of the process of work division will result in further, integrated, flexibly automated manufacturing sections which are oriented towards partial classes and with a high degree of cohesiveness. In this context, the proven forms of specialization, cooperation, combination and concentration in the combine and factory must be used even more effectively. The available solutions, for instance, integrated manufacturing sections specialized for particular items, must be perfected by the use of industrial robots, transport and chaining devices, etc. For all partial classes not yet covered new system solutions must be implemented in expansion stages. With an increasingly automated capture of production data, computer-aided manufacturing control must be extended to the complete manufacturing process.

The creation of internal means for an efficiency increase increasingly

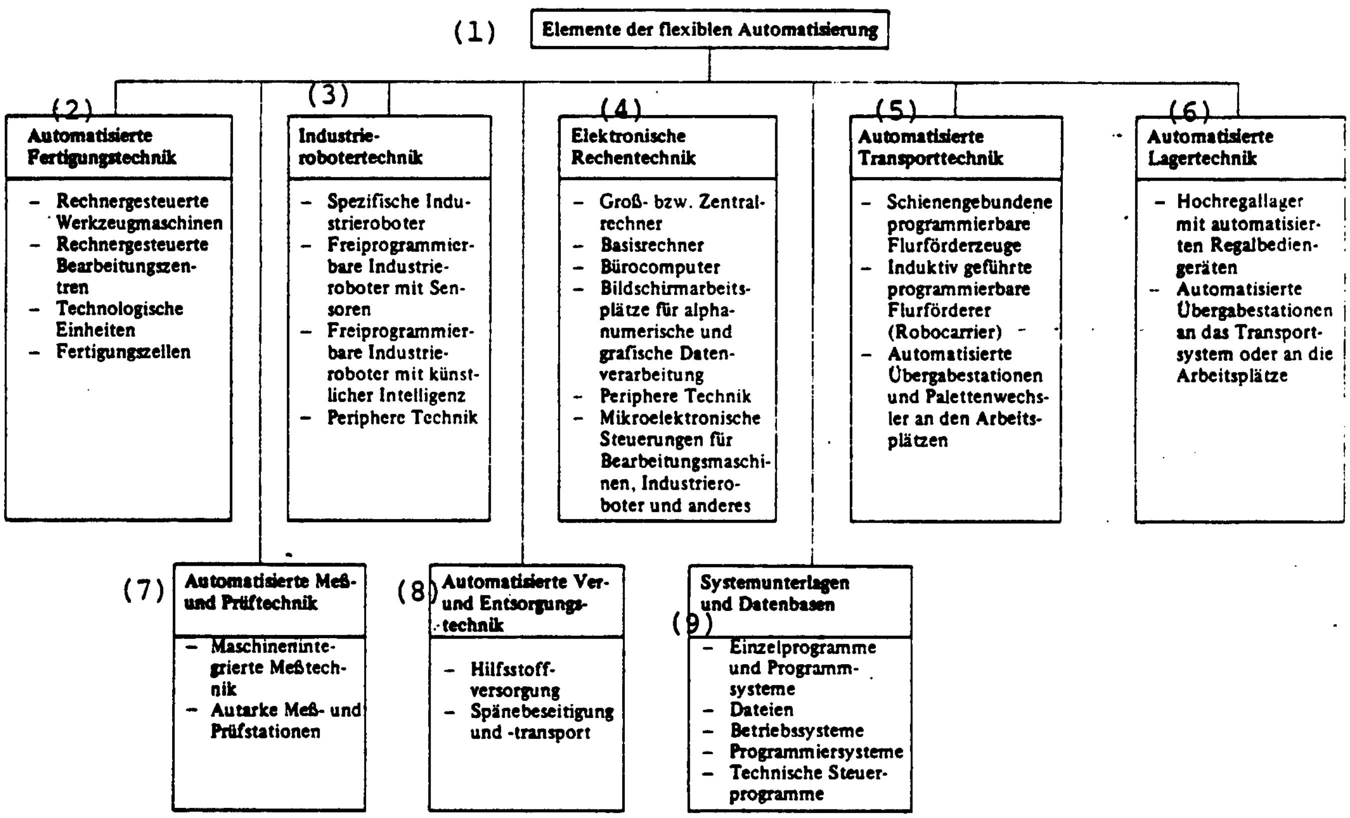
assumes the primary responsiblity for the material-technical implementation of complex automation projects. The means for increasing efficiency center around "the production of highly productive, combine-specific equipment with the objective of making complex technological processes more efficient in a comprehensive manner, both by using and modernizing the machinery currently available and by extensive application of the latest technological advances such as robot technology and microelectronics."(11)

The combines must be able to automate complete technological processes using their own means. Therefore, quality and quantity of the means for increasing efficiency must be developed significantly.(12)

The implementation of complex automation entails particularly stringent requirements with regard to automation of the assembly processes due to the extent, variety and complexity of the assembly cells to be created. The assembly cells to be created must have high technical efficiency (number of freely programmable axes, use of sensors, precise positioning, measurement of forces and moments), reliability and a high flexibility with regard to the modules to be assembled as well as the products. Starting automated assembly at the workplace, flexible automated assembly sections must be established step by step.

Because of their effects on the working and living conditions of the workers in particular, complex automation projects require thorough political-ideological work as a preparation for automation. In this context, project-related party work teams are a proven method for including the workers and mobilize creativity and personal commitment. The actual process of working out a solution must be tightly controlled by the director-general on the basis of the specification sheets. A proven method has been the use of project leaders from technical areas and from cooperating research institutions who have the necessary authority and power to coordinate the tasks, to monitor performance and to organize the cooperation of all participating collectives according to plan.

The experience of combines which have been successful in the area of complex, flexible automation shows that the collectives made the best progress when partial solutions were developed and implemented gradually based on careful process analyses. Starting the comprehensive preliminary work for comprehensive solutions as early as possible creates the potential for a future performance and efficiency increase in the combines and factories.



(10)
Abbildung 1 *Elemente der flexiblen Automatisierung*

1. Elements of Flexible Automation

2. Automated Manufacturing Technology

   --Computer-controlled machine tools
   --Computer-controlled machining centers
   --Technological units
   --Manufacturing cells

3. Industrial Robot Technology

   --Specific industrial robots
   --Freely programmable industrial robots with sensors
   --Freely programmable industrial robots with artificial intelligence
   --Peripheral technology

4. Electronic Computer Technology

--Mainframe or host computers
--Basic computers
--Office computers
--Terminal workstations for alphanumeric and graphic data processing
--Peripheral technology
--Microelectronic controls for

processing machines, industrial robots and others

5. Automated Transport Technology

--Railbound programmable floor transport vehicles
--Inductively controlled floor transporters (Robocarrier)
--Automated transfer stations and pallet change at the workstations

6. Automated Storage Technology

--High shelving storage with automated shelf accessing devices
--Automated transfer stations to the transport system or to the workstations

7. Automated Measuring and Testing Technology

--Machine-integrated measuring technology
--Autonomous measuring and testing stations

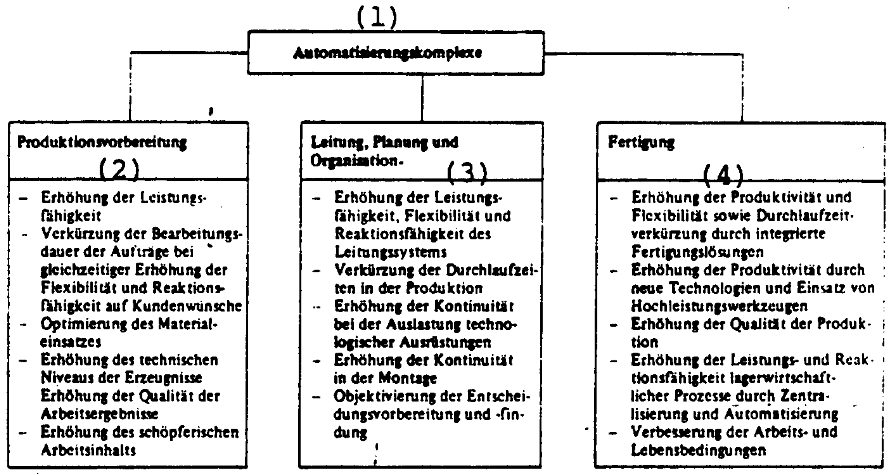
8. Automatic Supply and Waste Removal Technology

--Supply of auxiliary materials
--Removal and transport of chips

9. Systems Data and Data Bases

--Individual programs and program systems
--Files
--Operating systems
--Programming systems
--Technical control programs

10. Figure 1 Elements of Flexible Automation



(5) Abbildung 2 *Typische Prozeßveränderungen bei komplexer Automatisierung*

1. Automation Complexes

2. Production Preparation

   --Increasing efficiency
   --Shortening the processing time for orders while at the same time increasing flexibility and responsiveness to customer wishes
   --Optimizing materials uses
   --Increasing the technological level of products
   --Increasing the quality of work results
   --Increasing the creative aspects of work

3. Management, Planing and Organization-

   --Increasing efficiency, productivity and response time of the management system
   --Shortening the process time in production
   --Increasing continuity while fully utilizing technological equipment
   --Increasing continuity in assembly
   --Objective decision preparation and finding

4. Production

   --Increasing productivity and flexibility as well as reducing throughput time by integrated manufacturing solutions
   --Increasing productivity by new technologies and use of high-performance tools
   --Increasing production quality
   --Increasing the efficiency and ability to respond of inventory-related processes by centralization and automation
   --Improving working and living conditions

5. Figure 2 Typical Process Changes Due to Complex Automation

Figure 3 Economic Benefits of Automation

Effect	Benefit	Selected Factors Determining Benefits
1. Direct labor savings	Wage expense reduction	Reduced work time required when following changed activity structures
	Reduced contributions to the social funds	Reduced wage expenses
	Reduction of directly wage-dependent overhead expenses	Share of directly wage-dependent overhead expenses in total overhead
	Increased profit from the reassignment of released workers	Productivity of the workplace to which the worker is reassigned; profit from additional production or average profit rate per worker/ year.
2. Increase in productivity (efficiency) of the workplace	Increased profits from the increase of the production volume	Reduction in machine time per performance unit; increase of the productively usable machine time fund; average profit rate per productive machine hour
	Reduction of specific costs	Reduction of specific, machine-dependent costs; degree of cost degression of the remaining overhead; material and energy cost savings when implementing new technologies
3. Reduction of the process time	Reducing losses due to tying up operating funds	Share of storage times, value of production in progress
	Reduction of storage and transport costs	Level of integration of processes, floor and area use
	Increased profit due to faster sales	Influence of time factor on prices and market shares

[continued next page]

Effect	Benefit	Selected Factors Determining Benefits
4. Increased flexibility	Reduction of retooling costs	Reduction in time required per retooling and in number of retoolings
	Increased profit from additional production volume	Increase of the productively usable machine time fund; increased time utilization
	Increased profit due to better ability to respond	Effect on market share, orders received and prices when orders are accepted and filled quickly
5. Increased quality	Cost reduction	Reduction of time, material and energy expense by ensuring quality; reduction of reject, rework and warranty costs; cost reduction for the user affecting the national economy
	Increased profit due to increasing the production volume	Increase in the productively usable time fund; improved order situation due to improved quality
	Increased profit due to extra profits	Effect of increased quality on price and profit

[continued next page]

Effect	Benefits	Selected Factors Determining Benefits
6. Improved reliability	Reduced operating costs	Reduced cost for material, energy, auxiliary material,work time and machine time; reduced expense for preventive maintenance; reduced expenses for defect repairs dependent on the number of defects and the average cost to repair a defect
	Reduction in the cost to the national economy resulting from downtime	Reduction in the amount and length of failures in the reproduction process of the national economy
	Increase in the production volume	Increase in the productively usable time funds; better use of time funds due to fewer downtimes and shorter downtimes
	Increased profit due to improved quality	Reduced losses due to reductions in quality
7.Improved materials savings	Reduced materials costs	Reduction of the specific material consumption due to better utilization of work material properties; bringing the raw part geometry closer to that of the finished part; material savings due to use of microelectronics; implementation of material substitutions for economic reasons

FOOTNOTES

1. Meeting of the Central Committee of the SED, E. Honecker, "In a battle-filled time we successfully continue the proven course of the X. Party Congress for peace and socialism," Dietz Verlag, Berlin 1983, p 28.

2. See 9th Meeting of the Central Committee of the SED, "From the Report of the Politbureau to the Central Committee of the SED", reporter: E. Honecker, Dietz Verlag, Berlin 1984, p 31.

3. With the development of GAP-systems (GAP - Gibkaja Awtomatisazija Proiswodstwa - Flexible Production Automation - the USSR also takes into account this development.

4. See 9th Meeting of the Central Committee of the SED, op. cit., p. 81.

5. "Economic Strategy of the Party - Clear Concept for Further Growth", Dietz Verlag, Berlin 1983, p 81.

6. See W. Hubner, W. Marschall, K. Steinitz, "Microelectronics, Development of a New Type of Technology and Comprehensive Intensification", "Wirtschaftswissenschaft," Vol 7, 1984, pp 983-1000.

7. See "Comprehensive Organization according to New Principles," Dietz Verlag, Berlin 1984, p 43.

8. See 9th Meeting of the Central Committee of the SED, op. cit., p 40.

9. See H.-D. Haustein, "Strategy of Flexible Automation: Computer-aided Development and its Effect on Productivity", "Wirtschaftswissenschaft" Vol 7/1983, p 1008.

10. The workstation for design and technology (AKT) A 6454 belongs to the work-related device technology for the computer and terminal assisted work in production preparation. Among other things, it makes possible computer-aided design, detailing, design of variations, the preparation of drawings and the development of complete technological processes.

11. 8th Meeting of the Central Committee of the SED, "From the Report of the Politbureau to the Central Committee of the SED", reporter: K. Hager, Dietz Verlag, Berlin 1984, p 34.

12. See 9th Meeting of the Central Committee of the SED, op. cit., p. 42.

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HUNGARY

BUDAPEST-MOSCOW DATA TRANSFER LINK

Budapest SZAMITASTECHNIKA in Hungarian May 85 pp 1, 9

[Article by Gitta Takacs: "Data Transmission Link Between Budapest and Moscow; Online Information Querying"]

[Text] At the beginning of March Minister of Industry Laszlo Kapolyi dedicated a data transmission line between the Electric Power Industry Research Institute (VEIKI) and the Soviet All Union Scientific Research Institute for Automated Information Systems (VNIIPAS). Thus our country is also linked into the computerized information network of the CEMA countries.

The VNIIPAS institute came into being 2.5 years ago and it became the switching center for information queries arriving in the Soviet Union and directed abroad from the Soviet Union.

Now, via a leased telephone line between the VEIKI and the Moscow institute, the 28 bibliographic databases of the VINITI, the largest S&T information center of the Soviet Union, can be accessed in the online mode from Budapest. These databases include veterinary science, mining, energetics, environmental protection, robotics, computer technology and agrochemical files, the databases of the International Science-Technology Information Center of the CEMA countries, the INION social science databases and the data bases of many other Soviet institutions.

From the VEIKI one can access the databases of Socialist countries which were earlier linked up with the center of the VNIIPAS institute, including data files which can be queried online in Bulgaria, Czechoslovakia and the GDR. Through the packet switching net between Moscow and Helsinki one can access the data network of Finland, through which one can make contact with a few Western data service centers as well.

A star network has developed with its center at the VNIIPAS institute, where a Norwegian made NORD-10 small computer provides the function of switching computer; calls from Warsaw, Prague, Budapest, Sofia and Havana and from Soviet institutes go to this computer. The GDR accesses the system through Prague while Cuba and Vietnam do so via an artificial satellite.

The database query demand frequently exceeds the technical possibilities, so previously reported query demands are automatically scheduled by a larger NORD-100 computer which can be called from the NORD-10. Last year Cuba and Czechoslovakia made the most active use of the online information query possibilities, with 360 and 346 hours of queries respectively.

Domestic users--researchers, engineers, commercial experts, economists--can use the net from the VEIKI terminal, free of charge until the end of the year on an experimental basis. The speed of data transmission--using a Latin-Cyrillic letter printer--is 300 bits per second.

It is planned that information queries appearing in Moscow will be executed from the ES 1040 computer of the VEIKI, from the databases of the OMIKK [National Technical Information Center and Library] and other institutes.

The majority of the accessible databases are Russian language ones, but there are also data files in the language of the country building the database (for example, Bulgarian, Czech, Slovak) and in the language of the documents processed (for example, English, German, French). At the VNIIPAS institute they are working on development of a uniform query language which will make possible queries in every database. This query language will provide a "linguistic interface" between the user and the query language of the databases themselves.

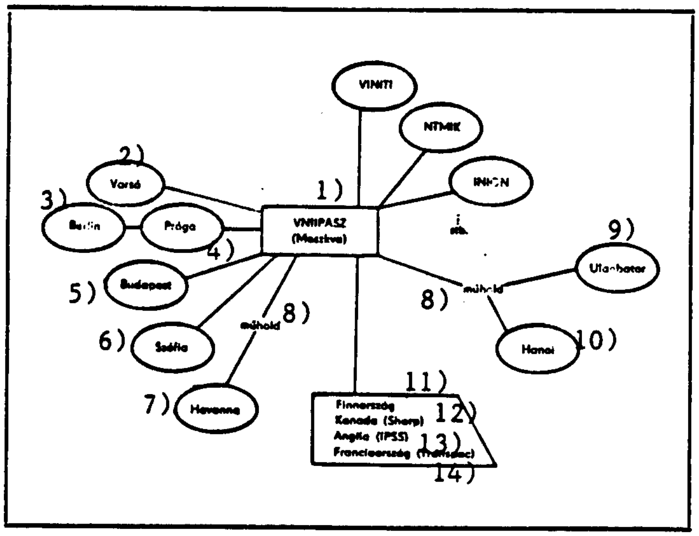

Diagram of Star Network

Key: 1. Moscow	6. Sofia	11. Finland
2. Warsaw	7. Havana	12. Canada (Sharp)
3. Berlin	8. Satellite	13. England (IPSS)
4. Prague	9. Ulanbator	14. France (Transpac.)
5. Budapest	10. Hanoi	15. etc.

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DEVELOPMENT, PRODUCTION OF DISPLAYS IN HUNGARY

Budapest SZAMITASTECHNIKA in Hungarian May 85 p 4

[Article by Kovacs: "Development and Manufacture of Displays; Domestic Status Report"]

[Text] With the rapid spread of micro and minicomputers there has been a significant increase in demand for display devices, picture screen displays and monitors, in regard to both quantity and model assortment. For this reason we asked a few domestic developers and manufacturers what they were planning, how many they were manufacturing and what new things would appear in the near future.

The Tungsram Company is the only enterprise in our country and in the socialist countries as well which manufactures monochrome monitor tubes or display modules. Monochrome picture tube manufacture also takes place in Europe at the Philips and Telefunken firms. At present there are about 15 types of 17-30 centimeter diagonal picture tubes, the great majority with 90 degree deflection and a 20 or 28 millimeter neck size. Each year the domestic market takes 5,000-8,000 monitor tubes or display modules. Probably the manufacturing enterprises could use more than this. The Tungsram Company offers primarily the 31 cm diameter tubes (green screen, P31 or P39 phosphor coated, 24 x 80 character arrangement) in an explosion-proof design. The enterprise began manufacture of the TUV.31 Display Module used most generally in displays last year. One can already find laboratory samples of reflection-free monitor tubes made on the etching principle and series manufacture of them is expected from the beginning of next year. They are also experimenting with picture tubes giving an amber display which is easier on the eyes.

The MTA SZTAKI [Computer Technology and Automation Research Institute of the Hungarian Academy of Sciences] is developing a number fo devices. The GD80 graphic display family is a vector drawing, image refresh model. The members of the family are: the basic terminal (BT), desk graphic computer (GC), intelligent terminal (IT), the autonomous (AGC) and the satellite graphic system (SGS). The GD80-BT display can be connected to PDP-1 (RSX and UNIX) and to IBM-type computers. The AGC and SGS members are used primarily in special purpose systems. The displays are made in two sizes in monochrome or color versions. The GD85 TEKEMU emulates simple line drawing displays, with high resolution rasters (black-white, one bit per pixel). It is plug-compatible

with the Tektronix 4014 type device. As a standard asynchronous (RS-232C) terminal it can be connected primarily to the PDP-11 compatible domestic and socialist computers. The GD85 TEXPRO is a text and figure editing picture screen terminal with an adjusted rectangular black-white screen (A4 size). It can be connected via a fast channel (local network or parallel interface) to TPA-11/48, TPA-11/440 or ES 1011 computers. It is suitable primarily for press, editorial and other demanding text or figure editing tasks. Development of the operating software is expected by the end of this year.

The picture tube computer technology devices of Orion are: the ADP-2052 display manufactured since 1983, the ODT-82 and ODT-8150 terminals and the OCD-500 color display. The monochrome ADP-2052 modern microprocessor (8080/A) system now stands in the foreground of manufacture; in its basic version it allows operation that is compatible with the DEC VT-52 terminal but it is also suitable for use in IBM and Datapoint systems. The number of units per year is about 2,000. Introduction of manufacture of an ADP-2100 Orion device compatible with the DEC VT-100, developed at the KFKI [Central Physics Research Institute], is being prepared.

They offer the ODT-82, based on a 6802 microprocessor, in three screen sizes; with its many user options it also emulates capitalist types widespread on the domestic market (for example, the Siemens TD8150). The DME point raster video monitors, which can be connected to computers, are made in digital or analog versions, in regard to drive, and in 28 or 31 centimeter picture tube sizes.

Videoton manufactures a total of about 10,000 picture screen displays each year. In addition to the already well proven microprocessor controlled VDT 52100 series displays--DEC VT-52 compatible--they are beginning series manufacture in 1985 of a VDN 52500 video terminal family which is compatible from above with the VT-100. According to the plans they will manufacture the VDC 52700 color graphic display for use in the VT-32 system this year and in the future will manufacture them on an OEM basis. The modern VDM terminals have expanded display characteristics (lines x characters), making depiction of double wide and double high characters possible. The VDC can be used well for graphic program packages; it has eight colors which can be displayed simultaneously and has a selection of 64 colors. The newest displays all have antireflection picture screens.

Mass production of the TEKEMU and TEXPRO configurations will probably begin in the first half of this year at the Communications Engineering Cooperative. The cooperative also manufactures the GD80 display family. They are also preparing to manufacture high resolution (1024 x 1024 pixel, one or more colors) GKS-compatible displays developed at the SZTAKI. Manufacture of the MCD-6A color picture screen monitor will begin in 1986, with an annual volume of 100. They will be producing their other color monitors (MC-6A RGB), which can be used in computers or terminals, in annual volumes of 1,000.

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NEW HUNGARIAN MATRIX PRINTER TO GO INTO PRODUCTION

Budapest SZAMITASTECHNIKA in Hungarian May 85 p 4

[Unsigned article: "Karman Matrix Printer: A Recent Domestic Development"]

[Text] The RPR210-01 domestically developed modern matrix printer manufactured by the Rozmaring agricultural producer cooperative, and soon to be for sale, will help satisfy the radically increased demand for printers in our country. It received its name from its inventor and developer, Peter Karman, an instructor at the Kalman Kando Electric Industry Technical College. On the basis of its technical parameters and interface unit it can be used primarily connected to recreational, school and home computers (Primo, Sinclair, Commodore, etc.) and to professional personal computers and in measurement data collection systems.

To an expert a few new solutions immediately appear striking. It might be mentioned first that the entirely original spool-driven print head works with special matrix plates--not pins--and is made of parts entirely free of capitalist import. Its paper feeding method is original as is the arrangement of the print-head to the paper, an advantagous solution from the viewpoint of noise reduction as well. The friction-driven paper-advance together with a new type of paper-guide ensure freedom from twisting and crumpling. The well designed, attractive cover is made with a noise reducing plastic lid. As a result the device is quieter than many well known printers.

Control of the RPR210-01 takes place by programming the built-in microprocessor and by interpreting the data and control character codes received via the interface. The printer can also operate in the graphic mode. To do this the number of characters can be communicated with the ESC sequence, then printing takes place in response to the final character. In the so-called quadratic resolution 512 or 1024 point graphic mode all 8 vertical matrix points can be accessed. The size of the alphanumeric characters can be doubled in the horizontal direction. It is possible to emphasize portions of text with over-printing in the same position. Graphic portions, normal and double width characters can be printed in one given line simultaneously. One can use a 13 mm nylon typewriter ribbon as the ink ribbon. Paper width can be varied between 206 and 222 mm; one can use roll paper, fanfold paper or individual A4 size sheets.

The RPR210-01 can display Hungarian accented lower and upper case letters as defined in the standard. According to information from Jozsef Szakszon, chief of the instrument industry branch of the cooperative, the guide price for the printer is very favorable--40,000 forints. The total capitalist import content of the device is 2 percent. Sales will begin in the third quarter of this year.

Print raster: 9 x 8
Speed (characters per second): 80
Character set: 96 ASCII, Hungarian diacritical marks
Number of positions on a line: 80
Adjustable character width: normal-double
Graphic mode: yes
Programmability: ESC sequences (normal, wide characters, line spacing, graphic mode)
Paper advance: friction
Number of simultaneous copies: 0
Interface: parallel, 8 bit Centronics compatible; option: serial, CCITT.V24 (RS232C)
Format control: optional
Power requirement (W): 40
Weight (Kg): 8
Size (mm): 480 x 150 x 270
Writing density: 80 characters per 172 mm (normal); 512 points per 185 mm (graphic)

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COMPUTER NETWORK FOR AGRICULTURAL COMMERCE

Budapest SZAMITASTECHNIKA in Hungarian May 85 p 9

[Article by A. K.: "SZUV Network Service for Agroker Enterprises"]

[Text] The SZUV [Computer Technology and Management Organization Enterprise] computer centers of Debrecen, Miskolc and Bekescsaba will link their ESR [Uniform Computer Technology System] systems together this year. The development is taking place with central support within the framework of the program titled Research and Development for Computer Technology Systems, a part of the National Medium-Range Research and Development Plan (OKKFT). The new network integrates and standardizes the services of the single center remote processing systems which previously operated independentaly in the three cities. Among other things it makes it possible for the Agroker [Agricultural Trade] enterprises having processing done by the SZUV to create and operate a uniform, online information system for their supplies of parts, artificial fertilizer and crop protection materials. The significance of the so-called Agroker Project is partly that building on existing hardware devices it will transform the large computer batched applications, which have been functioning well thus far, into online remote processing systems and the significance is partly that with the new network service the Agroker enterprises can use the databases of each other as well. The topology of the network which is being created can be seen in the diagram. Preparing for experimental operation of the new net requires chiefly software development work. At present they are working on supplementing the network control software (SHADOW). According to the plans the expansion modules (SNE) developed by experts from the SZAMALK [Computer Technology Applications Enterprise] will be in operation at all three sites by July. It is expected that the computers will be linked together in September. They intend to have 1200 baud synchronous data transmission between the three SZUV centers on leased lines. Following the experimental operation, which will last until the end of the year, "live" processing on the net is expected to begin at the beginning of next year.

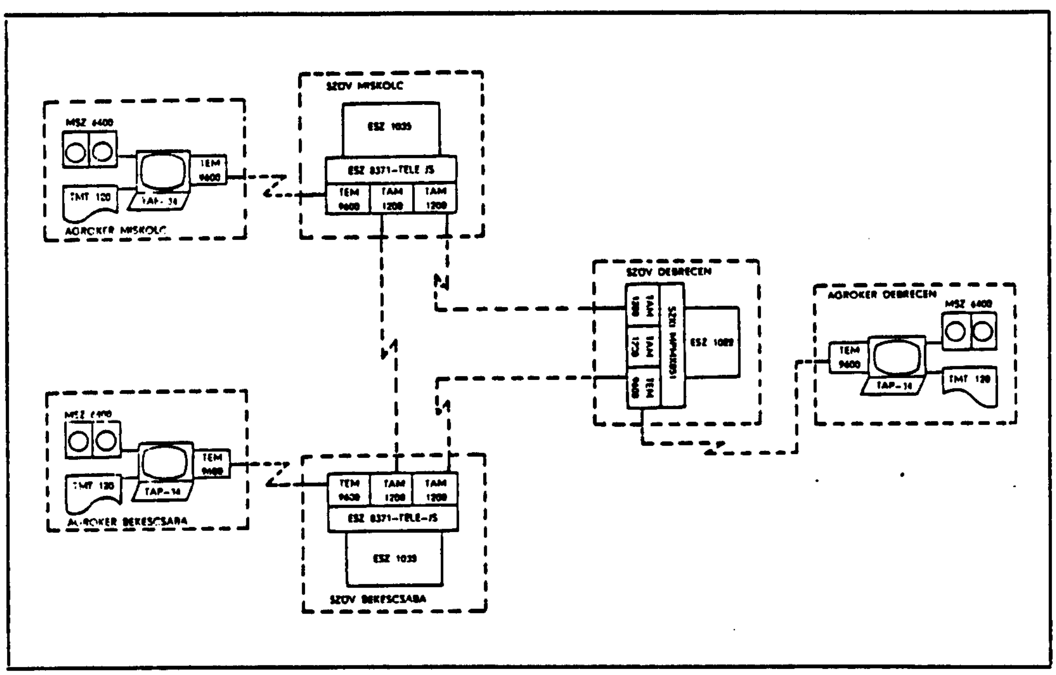
In the experimental phase experts from the SZUV will continue to study the possibility of a link to the NEDIX net of the Hungarian Post Office and the reliability of the computers for network operation. They also want to get experience on how the new online processing will affect the day-to-day operation of the customer enterprises, seeking the common interests of the

Agroker enterprises in extending the development. They will study future use of the new network services in a possible Agroker association.

In regard to the computer systems of the net, in the Debrecen computer center of the SZUV there is a 1 M byte ES 1022 computer with an IBM OS 21.8 operating system, eight 29 M byte magnetic disk drive units and an SZKI [Computer Technology Coordination Institute] MPMX 051 remote data processing processor (handling a maximum of 12 lines, of these four are synchronous lines). In Miskolc they have the ES 1035 system, expanded last year, with six 100 M byte and eight 29 M byte disk drives and a 48 K byte Tele-JS (ES 8371) remote data processing control unit. The ES 1035 system in Bekescsaba has nearly the same configuration as the one in Miskolc; its Tele-JS system was recently expanded to 240 K bytes.

The SNE network software processing the SHADOW transactions offers the following possibilities: sending jobs or asking for results from the several computers, or from remote terminals connected to them; data exchange between applications running on the various computers; message links between terminals without regard to terminal type; starting conversational mode operation in special cases.

The integrated network service developed for the Agroker enterprises could serve as a model for the creation and operation of distributed systems for other enterprises of national scope which conduct business with the SZUV.



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CZECH COMPUTER HARDWARE DISPLAYED IN BUDAPEST

Budapest SZAMITASTECHNIKA in Hungarian Jun 85 p 5

[Article by AK: "Czechoslovak Economic and Technical Days"]

[Text] The magnitude of Hungarian-Czechoslovak deliveries in the area of computer technology devices comes to about 3 million rubles per year. The Czechoslovak side claims that in the future graphic computer systems may constitute a significant part of their export. They have many years' tradition in the manufacture of graphic equipment--the DIGIGRAF drawing tables and the BAK coordinate writers can be found here too. The newer and more developed products include the minicomputer based systems which make the solution of an entire series of additional tasks in the area of graphic information possible.

We could hear all this at lectures given in the programs of the Sixth Czechoslovak Economic and Technical Days held in Budapest 10-15 April. The primary goal of these lectures concerning the special areas to be taken into consideration in future cooperation was a search for possibilities for mutually advantageous specialization and cooperation and for joint enterprises on third markets.

The new Czechoslovak graphic systems are delivered with improved graphic input/output units and--in the case of the newest types--with graphic terminals. Beginning in 1986 the newest products will be for sale to Hungarian users.

The POK-SM-GRAFIKA and IGS 4500 conversational graphic systems enhance primarily the automation of planning and design work. The IGS II conversational graphic work site can be connected to a larger graphics system and is equipped with microcomputer, graphic display, a small (A3) plotter and digitizing equipment.

The graphic output devices include a new representative of the drawing table family, the DIGIGRAF 1208A, which has better technical parameters than the earlier types. Its drawing speed is a maximum of 700 mm per second.

The ES 7240 printer, using the electrostatic principle, is also a new development which can be used to record graphics.

Among the graphic input devices the DIGIPOS 1208 digitizer (it uses a TV link to read graphic information) and the microprocessor controlled 1208 DIGITIZER with free moving probe (electromagnetic principle) merit attention.

Some types of the graphic terminals based on micro or minicomputers are being manufactured already, while preparations to manufacture others are under way. In addition to the graphic raster or vector terminals they also use so-called semigraphic displays modified in various ways. The SM 6405 graphic video terminal contains a graphic processor, keyboard, display and control circuits. Its display is monochrome and has a light pen. The ODI 6340 color graphic raster terminal can be used in IGS conversational systems as well. Preparations to manufacture the SM 7408 graphic video terminal are under way. This terminal is made to process graphic and alphanumeric information for self-operating control systems.

A special lecture dealt with the MSR II series computer systems being prepared in Czechoslovakia. The listeners could become acquainted with the SM-52/11 minicomputer, the SM-50/50 16 bit modular microcomputer and the SM-50/40 microcomputer.

Czechoslovak Graphic Systems:

Graphic System	Computer	Graphic Output	Graphic Input	Graphic Terminal
ES 7907	ES 1026	DGF 1208 DGF 1712	DGT 1208	--
ES 7941	ADT 4500	DGF 1712	DGT 1208	--
ES 7942	ADT 4500	DGF 1208	DGT 1208	--
DIGIKART	ADT 4500	DGF 1208 DGF 1712	DGP 1208	possible
POK SM GRAFIKA	SM-4/20	DGF 1208 BAK 5T	DGT 1208	SM 7405
IGS 4500	ADT 4500	DGF 1208	DGT 1208	ES 7943
IGS II	ADT 4700	under development		ES 7943

DGF=DIGIGRAF; DGT=DIGITIZER; DGP=DIGIPOS

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STANDARDIZATION OF COMPUTER TERMINOLOGY URGED

Budapest SZAMITASTECHNIKA in Hungarian Jun 85 pp 6-7

[Article by Dr Ivan Szabo, member of the Publications and Terminology Committee of the Janos Neumann Computer Technology Society: "For Our Language, Against the Word 'Komputer' (?) And Its Companions!" Originally published in MAGYAR SAJTO No 11, 1984]

> [Text] "If it is true of any country that 'the nation lives in its language' then it is certainly true of us, the Hungarians. We can give thanks to our language for the fact that our nation lives and flourishes after 1,100 years. Let us preserve our language and teach beautiful, pure speech to the young. The family, the school, the media, literature and art should aid this." (Excerpt from verbal additions by Janos Kadar to the Central Committee report given at the 13th congress of the MSZMP)

A debate in connection with the special language of computer technology is taking place with varying degrees of vehemence in the Mother Tongue Committee of the Hungarian Academy of Sciences, in the World of Language program of Hungarian Television and in the professional and daily press. I am writing in the name of the editors of the S&T journals SZAMITASTECHNIKA and INFORMACIO ELEKTRONIKA and in the name of the PTB [Publications and Terminology Committee] in order to dissolve certain rigid positions which can be sensed in the debate concerning the necessary or unnecessary use of professional jargon, so that the rejecting or the undecided positions can come closer to one another within the framework of the debate, so that our language, forever being developed and enriched, would preserve its purity and so that technical expressions of foreign origin would be accepted only to the degree absolutely necessary. I would like to convince people and to prove that those whose arguments are unacceptable are rejecting this out of snobbism.

Responsibility of Those Providing Information

I make no secret of the fact -- I even want to demonstrate -- that if a person who is not an expert uses professional jargon then he may make himself look ridiculous with his vain pedantry. In addition, naturally, I would like to show in a professional way -- especially for information experts -- when it is

necessary and when it is unnecessary to use computer technology experessions of foreign origin.

The protection of our language is not the task of linguists only, for us all it is an obligation, for the experts as well as those working in information.

It is difficult to over-emphasize its significance. We need to be united instead of pulling apart. The basis for unity might be provided by the standards dealing with special computer technology expressions which have appeared recently (see below). Linguists also must do everything to help the work of the experts, to create conditions for a more profound understanding and thus creating Hungarian equivalents for computer technology words of foreign origin. In my opinion profound understanding means, for persons whose mother tongue is Hungarian, an understanding based on use of their mother tongue, on use of Hungarian expressions. This is true not only for the expert but also for the broad strata of society. Computer technology is an interdisciplinary field. It is increasingly open, increasingly tends to embrace every profession, and so its exclusiveness of a few years ago is ending. The linguistic detachment of the experts is no longer justified at all. As a result of the development of microelectronics there has been a domestic socialization of computer technology use and so we can talk about the democratization of computer technology, its being accessible to everyone. This is a social matter! An awareness of the expressions of this profession at the mother tongue level is one of the conditions for this socialization and thus of our social progress.

A lack of understanding at the mother tongue level can represent constraints on the acquisition of information, and thus on use, especially for the great majority of society, the laymen not knowing a foreign language. And an understanding at the mother tongue level is indispensable for experts too, which has been recognized already to some extent especially in the course of interpreting the newly appearing concepts.

Unprecedented responsibility in this regard falls on the agencies and workers in domestic information (editors, journalists and copy editors alike) because they are maintaining contact with the broadest strata of society in the form of their articles and commentaries.

Why Should We Defend Our Language?

The editors of SZAMITASTECHNIKA and INFORMACIO ELEKTRONIKA embrace every initiative from authors or others which defends the Hungarian language and facilitates understanding, and they urge cooperation and unity to achieve this end. They do so out of three fundamental considerations:

-- First of all in order to provide the preconditions for the already mentioned socialization;

-- In order to develop uniform usage for experts mastering expressions which differ from shop to shop even within linguistic communities, acquainted with their professions in different languages (English, Russian, French, German);

-- In the interest of Hungarians living beyond our borders, especially the Hungarian computer technology experts there. With the development of technology in industrial societies, where new words are adopted and developed, they would continue to lose the close linguistic contact with our mother tongue and become even more uncertain. This happens in Czechoslovakia under the influence of Czech, English and Russian; in Romania under the influence of Romanian, French and German; in the Soviet Union under the influence of Russian and English; in Austria under the influence of German and English. We could also cite the example of the first generation in England, the GDR, the FRG and Sweden!

This is true of every profession, but the already mentioned speeial character of computer technology and its past of only 30-40 years -- in contrast to the several millenia past of medical expressions and their use only by experts -- combine to lend an especially timely character to this problem.

Whose Task Is It?

For this reason, too, it is we who live in Hungary, who must care for our language, because no one else can do it for us. We are the depositaries for it -- not only the linguists, but also other experts and those working in information. SZAMITASTECHNIKA and INFORMACIO ELEKTRONIKA are doing this deliberately. The Computer Technology Terminology Committee of the Hungarian Bureau of Standards (MSZH) and a few professional book publishers -- primarily the SZAMALK [Computer Technology Applications Enterprise] -- are interfacing the the spoken language and the professional literature of the trade, promoting understanding at home and in the Hungarian language area by using the standards.

MSZH's Work

The activity which the terminology committee has conducted since 1976 is of unique significance in this area. A collection of standards has appeared in book form as a summary of its work thus far, "Az adatfeldolgozas fogalommeghatarozasai es tobb nyelvu szotara" [Concept Definitions and Multi-Language Dictionary of Data Processing] (Standards Publishers, Budapest, 1984).

We would like to announce here also that standards have been prepared since publication as well. These deal with data protection, data security, reliability, availability and program languages. Standards will be prepared soon which will summarize the professional words for data transmission and computer graphics.

The committee prepares its standards proposals on the basis of collective linguistic feeling, seeking a healthy optimum:

-- by coining and creating appropriate Hungarian expressions; and

-- by maintaining foreign words (and permitting Hungarian phonetic orthography).

If it did not do this it would have to go to extremes -- either Hungarianizing everything in a forced way or keeping the English expressions. In this way there would be a proliferation of words with Hungarian appendages which would not easily fit into the sound system of our language.

As a frightening example let us give an artificially formulated sentence which is not devoid of reality: "A real time computer extern memoriajanak indexszekvencialis file-jaban a display-s terminal klaviaturajarol szekvencialisan inputolt az operator rekordokat, majd ezt a programot TSO alatt SVS felugyelete mellett debug-oltuk." [This translates as: The operator input the records sequentially into the index sequential file of the external memory of the real time computer from the keyboard of the display terminal and then we debugged this program under TSO with the supervision of SVS.]

Naturally, we could say this in Hungarian too -- or in a more Hungarian way -- although a few technical expressions would still make understanding difficult: "A valos ideju uzemmodban mukodo szamitogep kulso taroloja indexszekvencialis adatallomanyaba a kepernyos terminalnal billentyuzeterol sorosan adott be a gepkezelo rekordokat, majd ezt a programot osztott ideju uzemmodban ellenoriztuk as SVS operacios rendszer felugyeletevel."

The standards contain 1,100 expressions. The committee decided that in 5 years it would review, from the viewpoint of their adoption, the expressions in the publication and those standardized later.

As official users of the standards we can say that the expressions contained therein have stood the test of time in the form given and only a few expressions have been challenged -- and justly so! It is unfortunate that they were not published 2-3 years earlier, at the beginning of the mentioned socialization, before the domestic appearance of personal computers -- "szemelyi szamitogepek" and not "personal computerek"!

In connection with the standards I would like to talk about their obligatory force. If, for example, a loading platform for a cart does not meet the standards, it can cause extensive economic damage. Terminological standards cannot really be compared with the very strict industrial standards, but perhaps they can be compared well with laws or other regulations, which are standards in the legal sense.

Principles, Results of Standardization

The professional practice based on the principles of standardization yields the following; the words accepted by the standards are given in all capital letters:

1. Taking over the original English, for example: ONLINE, OFFLINE (no longer hyphenated, as "on-line" but written together!);

2. Writing as they are pronounced those expressions which cannot be translated appropriately, for example: mikroprocesszor, multimikroprocesszor, megamini, HARDVER, HARDVERMONITOR, SZOFTVER, BIT, BAJT, MAKRO, REKORD, MASZK, TESZT, AKKUMULATOR, etc. Let us note that in an appropriate context it would

be quite proper to use machine or device, etc., instead of the word "hardver", but a Hungarian rendering of the collective term "szoftver" -- intellectual products, "szellemi termekek" -- is more complicated, although not impossible.

3. Very Good Hungarian Expressions:

computer = SZAMITOGEP (and not "komputer"!)
minicomputer = miniszamitogep
microcomputer = mikroszamitogep
chip = lapka
file = (ADAT) ALLOMANY (and not "adategyuttes")
(magnetic) disk, in the U.S. = (MAGNESES) LEMEZ
(magnetic) disc, in England = (magneses) lemez
flexible disk or floppy disk = HAJLEKONY (MAGNESES) LEMEZ
disk drive = LEMEZMEGHAJTO
(magnetic) tape = (MAGNESES) SZALAG
task = FELADAT
display device = MEGJELENITO
keyboard = billentyuzet (and not "taszatura"!)
operator = gepkezelo (and not "operator"!)
(operator) console = (GEP) KEZELOPULT
interface = csatoloegyseg, illesztoegyseg
flowchart = folyamatabra
storage = TAR, tarolo
memory = TAR, TAROLO (and not "memoria")
batch = KOTEGELT
I/O = B/K
job = MUNKA

It can be seen already that the Hungarian equivalent, "munka", of the word "job" is having difficulty being accepted. But if the standards made it possible to use the word "job" it would cause confusion in Hungarian text [where "jobb", pronounced "yob", means "better"] because it would not always be on the tip of the tongue of the Hungarian reader to immediately say "dzsob" [the Hungarian spelling for the English pronunciation] when reading "job".

The expressions "komputer = computer = szamitogep" are badly adopted in professional society -- and outside of it.

The English expression is especially confusing in Hungarian because society will include in this "category" not only the computer proper but also the pocket calculator, microprocessor, devices contining electronic elements (for example the "computeres vacu" [computer vacuum]), or a type of television manufactured by Videoton, the Computer Technic, and even A/D (analog-digital) transformers, sensors (either "szenzor" or "erzekelo"), synthesizers and "music composing computers" (?).

In connection with the bad use of the word "computer" in domestic information we are witness to something more than is necessary, something more than a faulty practice, which develops on the soil of defective professional information. The result is faulty information and the development of faulty concepts.

In regard to the use of computer technology terms the information practice objected to would be acting properly if it investigated the appropriate report, because in the cases mentioned, for example, "elektronikus vaku", [electronic vacuum], or iron, etc. is the good expression. In no way can these devices be considered to be "computerized," they are only electronic -- and this is no small matter either!

The use of the Hungarian "tavadatfeldolgozas" [remote data processing] is a bad habit also, probably translated from the German (Datenfernverarbeitung), because it really means "tavolsagi feldolgozas" or briefly "tavfeldolgozas" (the English being "teleprocessing").

Remote processing with appropriate hyphenation, "tav-adat-feldolgozas", would be acceptable, but it is clumsy because the breaks within the word are hard to indicate and are not desirable.

Who Uses the Standards Today, and Who Does Not?

1. They are used by:

-- an ever expanding circle of publishing experts, including lecturers appearing before the public;

-- the official press of the profession, thus SZAMITASTECHNKIA and INFORMACIO ELEKTRONIKA;

-- the book editors of the SZAMALK;

-- a few book publishers;

-- more recently the readers and editors of books, copy editors of a few domestic papers, journalists and authors of articles;

-- members of the Computer Technology Terminology Committee of the MSZH;

-- the IBM office in Hungary, in its Hungarian language publications; and

-- the Delta program on TV.

2. They are not used by or are rejected by:

-- those working in an immediate computer or programming environment, or computer operating environment, because of bad habits;

-- those just now becoming acquainted with the profession, who put fashionable, "good" sounding jargon into their sentences;

-- a few people working in non-professional information (journalists, reporters) -- perhaps not properly prepared -- in the newspapers, periodicals, radio and television;

-- uninformed translators;

-- snobs, without regard to whether they are laymen or have expertise;

-- those preparing advertising for domestic manufacturers;

-- and, unfortunately, some of the teachers too. An example of this is the fact that the HT computer has "School Computer" written on it instead of "iskola-szamitogep"! (Although they hardly expected to sell the machine in the U.S. or England.)

Negative Consequences of Affected Pedantry

It is to be hoped that what has been said makes it clear and certain that the negative consequences of this affected pedantry are the following:

-- it slows down the desirable socialization of computer technology, because difficulties of interpretation arise, those not knowing the language are afraid of bad pronunciation, and the incorrect spelling causes programming errors;

-- it leads to superficial understanding and a lack of definitive, profound knowledge, especially among those children who use but do not understand the professional terms.

What does the mastery of the correct Hungarian terminology and the accompanying definitions mean for the student, child or adult alike?

Correct Terminology, Youth

In connection with this we must recall a very important function of language. Geza Fulop, in his book titled "Man and Information", writes about this as follows: "People need to exchange not only conceptual-logical content, but also emotional content. According to Piaget, affectivity is an energy source which influences intellectual activity to a significant degree. And the mother tongue has a gigantic role in this regard. The mother tongue gives thinking that emotional charge which constantly nourishes the intellect and makes true human communication possible."

The special terms of computer technology can be truly understandable only if one masters the Hungarian expressions and professional definitions in addition to the special foreign expressions. As an explanatory dictionary, the already mentioned collection of standards offers aid to this. Through its use we can overthrow the artificially cultivated domestic myth about computer technology, and if information experts take it seriously, the elucidating, aiding role of information can be fulfilled more effectively. The media of information should inform and enlighten, not disinform.

Our colleague Gyula Locs has a simile which I appreciate very much. According to him: "If we want to teach someone to play the violin, then from the first moment we must make him follow certain rules in regard to the correct holding of the violin. We must act in this way even if the student has some original ideas with which he attains initial successes. The success of later productions depends on the initial discipline."

After all this, let us formulate the essence of the matter, namely, taking into consideration the technological and technical level of the day, when the foreign expressions must be used and when they must not be used.

When They Must and When They Must Not...

1. The technical expressions of foreign origin must be used only:

-- if I am communicating instructions with a computer, for example via its keyboard, with keys inscribed with a word, or letter by letter with a keyboard not having Hungarian accented letters or Hungarian diacritics;

-- when interpreting messages received from a computer (for example, via its display or printer);

-- when writing a program or when developing a program or operating system;

-- in the case of computer or program descriptions, computer books and computer operation.

2. The foreign expressions should not be used:

-- if the computer, programming or machine operation environment do not require it, i.e. in speech and in writing;

-- if one has available a sufficiently large storage area and if a special programming language can be used; a few computers already "accept" and interpret the Hungarian special terms, if only to a limited extent.

Future

By the end of the century, with the appearance of fifth or sixth generation computers, all these problems will be resolved further, for the gigantic memories, great processing speeds, methods of building formalized data bases, systems, language processors and the languages enhancing the realization of the so-called man-machine link for people who are not computer experts will make it possible to converse at the mother tongue level even while using international networks.

Since the experts see this already, we should ask the journalists to let themselves be convinced of the truth of the experts, for their own sake and for the sake of society and information. And we will help them.

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COMPUTERS IN CHEMICAL INDUSTRY

Budapest SZAMITASTECHNIKA in Hungarian Jun 85 p 9

[Article by A. K.: "Application Trends in Chemical Industry"]

[Text] It is a vital question for our enterprises today that they have immediate and full access to information and react sensitively to internal and external market changes. All this makes it necessary to develop modern, computer based online conversational information systems. The chemical industry enterprises have also recognized that batched processing no longer is suitable for the above circumstances. Within the framework of the program titled "Research and Development For Computer Technology Applications Systems," part of the National Medium-Range Research and Development Plan (OKKFT), central financial support was provided for development of the conversational enterprise information systems established at heavy chemical industry and processing chemical industry enterprises.

The essence of the system concept is distributed hierarchical process-oriented processing. The information is processed in the conversational mode with small business computers or personal computers at the site where the information arises and with minicomputers at the enterprise level. Subsequent large volume processing is done on large computers,installed either at the headquarters for the enterprises or at the organizational and computer technology enterprise of the chemical industry, Econorg. The systems being built up gradually with the teleprocessing net have a modular structure. Econorg also solves the problems connected with development of the leadership information system at the affected enterprises.

The tasks to be accomplished were scheduled for 4 years (1982-1985). As one of the system patrons of the program package, it is developing an enterprise guidance system based on operational inventory records by adapting the MAS-M program package. As its own development it is solving interactive financial and accounting tasks on behalf of the Tiszamenti Chemical Works, by developing further the batched systems already in use. Labor and wage accounting systems developed domestically are being adapted. But in the case of the fixed assets management and maintenance systems they are adapting a system developed by the Slovak Chemical Industry Trust.

Thirteen Member Enterprises

At the beginning of 1985 a minicomputer was already operating or was being installed at a significant number of the member enterprises (see table). Preparation for computer acquisition and setting up a computer room is under way at the rest of the enterprises. There has also been significant progress in regard to small business computers and personal computers. One can already find more than 100 microcomputers at the chemical industry enterprises included in the project. Applications have begun at the member enterprises, adjusting to local conditions. Econorg prepared a methodological modeling system (a so-called meta-information system) with the aid of which the enterprises are able to evaluate and analyze their existing procedures. A so-called interactive production guidance system (INTER) which provides production guidance, production preparation, needs calculation, and optimization according to various target functions has been prepared and is in operation. The labor affairs system has been finished and is available in several versions. Development of the wage accounting system will be completed this year. Reference application of the MAS-M is being developed at Budalakk, at the Oxygen and Acetylene Factory, at the Hungaria Synthetics Processing Enterprise and at the Budapest Chemical Works. The Tiszamenti Chemical Works is the reference enterprise for applications not based on MAS-M.

In the meantime they have included in the developmental plan a transportation subsystem, a minicomputer version of which will be ready by the end of this year.

Advantages

The project is advantageous for the member enterprises because they will be able to exchange their experiences--for example, system adaptation, etc.--and they will have access to every system prepared at the joint enterprise. It is also significant that as a result of the developments done at Econorg the system development times become shorter and the surveys preceding the developments are better and more precise. Developments realized in this way are faster, certainly qualitatively better and cheaper and the operation of them is more controlled. The experts can exchange their experiences with introduction and operation.

Problems

Naturally there are problems with preparation and introduction of the systems. For example: device acquisition takes about 1.5-2 years calculated from the time of the decision; it is difficult to get background storage peripherals in sufficient numbers or with adequate capacity and quality; preparations for adopting the conversational technique are not adequate everywhere.

It has been possible to help with some of the problems in the meantime. Thus, for example, the member enterprises received central support to acquire background memories.

Despite the many problems to be solved the experts of Econorg feel that the originally planned developments will be completed by the end of this year.

Enterprise	Computer type	Year of Acquisition
Borsod Chemical Combine	ES 1035 TPA-11/440* TPA-11/440*	1984 1986 1986
Budalakk Paint and Synthetic Resin Factory	TPA-11/440*	1986-1987
Budapest Chemical Works	TPA-11/48	1986
United Chemical Works	M08X, Proper-8, Daro 1372	1983-1984
North Hungary Chemical Works	TPA-L	1981
CAOLA Cosmetic and Household Chemical Industry Enterprise	SZKI Siemens based teleprocessing network	1983-1986
HUNGARIA Synthetics Processing Enterprise	SM-1420	1985
Nitrochemical Industry Sites	TPA-11/48	1984
Oxygen and Acetylene Factory	TPA-11/440*	1986
Peremarton Chemical Industry Ent.	Floppymat-SP Daro 1372 Commodore-64	1984-1985
Pet Nitrogen Works	ES 1010 ES 1010	1980 1980
Tiszamenti Chemical Works	TPA-11/48	1985
Chemical Works Designing Ent.	TPA-11/40 TPA-11/48	1983 1984

* Means TPA's supplemented with the TPA-Quadro net.

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ACADEMY RESEARCH INSTITUTE PRODUCTS WIN FAIR PRIZES

Budapest MAGYAR HIRLAP in Hungarian 15 Jun 85 p 10

[Article by Istvan Palugyai: "Research for Applications"]

[Text] From the 11 grand prizes at the recently concluded spring BNV [National Trade Fair at Budapest] three were won by the research institutes of the Hungarian Academy of Sciences. Although this proportion merits attention by itself, it is even more remarkable if one realizes that these institutes have never won an award before.

The first grand prize was shared by the Computer Technology and Automation Research Institute [SZTAKI] and the United Electrical Machinery Company [EVIG]. It was for the development of a microprocessor-directed control, steering and interrupt system to be used with machinery involved in the transfer of fuel cassettes at nuclear power stations.

The background and significance of the prize were described by Jozsef Borka, candidate of the technical sciences, and the person responsible for this area within the SZTAKI.

Manipulator in Reactor

In the last few years nuclear reactor facilities have undergone a change from one generation to the next. The first generation has outlived its usefulness and today new, recently developed units are arriving continuously. As the development of the newer generation nears completion, according to tradition Hungary has received the commission, within our specialized work distribution system, to design a fuel assembly transfer device and a number of tools of lesser significance. The huge automatic manipulator device which moves in seven to ten directions in the inner room of the reactor is like a robot assembly crane. It transfers the cassettes containing radioactive material and the associated tools, or puts these into the reactor. This unit handles the yearly inspection, and conducts the change of the fuel elements and those units controlling the chain reaction. The unit works under very dangerous conditions since in the reactor space there is not only radiation but also 50°C temperature and 95 percent humidity. There are of course no personnel here. The device needs a high degree of automation and we have developed the highly reliable,

intelligent, measuring, controlling and steering system with seven microcomputers, and also the strong-current electronics that perform the controlled movements. This part, together with other electrical parts of the machine is made by the EVIG for the Ganz-MAVAG Company which is responsible for the delivery of the complete fuel cassette assembly transfer device.

What novelty value does your work have?

Such unique, large systems are sold only by a few large Western companies such as General Electric and Siemens, and they are never mass-produced. For our results we had four patents granted. Nevertheless, taking into account the electronic level of the United States and of Japan, we can't call this frontier technology. It is novel work of a European standard which has served as the source for the publication of four international and three Hungarian research articles. So far we have made two of the complete devices, for 440 megawatt reactor blocks. The control system for the new transfer unit for 100 megawatt reactors has been completed recently in the laboratory of the institute and we will begin manufacturing trials soon. With this we have substantially finished the part of the development expected of us, and now it is the turn of the manufacturing company to deliver two to six units yearly until 1990. By the way, the complete value of such a machine is 80-100 million forints, of which 25-30 million is the value of the electronic system. Of this latter the major part, the control and strong-current electronic system, was developed by us.

The KGST [Council of Common Economic Assistance] task has made a significant profit for the research institute where it was said that problems of an academic stamp, because of the nature of their work, form a smaller part of their activities. They, as technical or computer technological institute usually work on the research and development of scientific problems the practical utilization of which is not long-term.

New KFKI [Central Physics Research Institute] Computer

The profile of the Central Physics Research Institute does not fit the previous statement. But even this highest forum of theoretical physics research is characterized today as much by computer and instrument development as it is known for fundamental research. Their newest product is the TPA-11/440 computer which received the second grand prize of the BNV. Laszlo Szonyi, chief of a science branch, says that here they regard as their vocation those links of the chain of innovation that require a high quotient of mental investment. Mass production is not the task of a research institute.

But what can the new KFKI computer really do?

We are talking about the newest and most powerful member of the TPA-11 computer family which is a megamini device used for general applications. It can be employed particularly well in business automation, office-automation, the control of production or when laboratory or process control work needs to handle large volumes of data. It can also be used when

linked to national computer networks. The category designation implies high productivity and a low price. The new unit, as far as its technical features are concerned, rises above similar computers available on the socialist market and in its construction resembles large systems. At the very least, in terms of its power, it rivals many so-called ESZR [unified computer system] main frames. Western technical products representing such a level of capability are currently under embargo. With the TPA-11/440 computer we could lessen the gap between the leading edge of computer technology in the world and our own position to within about 3 years, but we could not close it.

In the eyes of a Hungarian expert this does not look at all as a trivial result...

Truly no. After all, the general electronic level in our country has a gap of 10 years to close. That's why the TPA-11/440 is a leading-edge product under our conditions, relying, as it does, on the about 20-year expertise accumulated in the Measuring and Computing Research Laboratory of the KFKI. The price of the computer is very favorable in comparison with the ESZR machines; depending on the different peripherals it is between 3.5 and 15 million forints.

What is the proportion of capitalist components in this system?

It is difficult to name an exact number because this changes with time. With early units the proportion is higher, about one-quarter of all components; however, the proportion of the parts imported from the capitalist countries for our earlier models has dropped to 3 percent upon manufacture in series. When this situation will apply to our new product is hard to say. Without a doubt, some Western components are cheaper than those obtained from imports from socialist countries. It is therefore questionable whether these latter should be built into our computer merely in order to improve the statistics. All considered, we hope that a few hundred units of this computer will be built. Not more, because we hope to come out in two or three years with a more advanced model.

Uncertainty of Manufacture

And where will these computers be manufactured?

According to the original plans at the SZKUBT Company, founded by Videoton and the Computer Coordinating Institute. This new organization has already started production in series and the first units are working at some customers. The SZBUT has in past years significantly supported the activities of its founders. For example, the manufacture of the subunits of the KFKI-delivered computer systems has taken place primarily here. Afterwards, in the KFKI only the performance check of the large systems is performed which also involves the modernization of the technological basis. Discussions and debates arise almost inevitably at this point. Hopefully, after these are over, the SZKUBT will strengthen its prominent position gained in the

manufacture of the top-of-the-line Hungarian computer technological products, and it will further serve the practical utilization of the research and development effort. The KFKI, however, entertains the thought of starting its own daughter company, if not in manufacturing --since this is served by the SZKUBT-- then for the support of the development of expert systems. The goal is for the research results to satisfy practical needs in more and more areas. In any event, the grand prize carries an obligation.

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